

**REMARKS****Drawings**

In the Office Action of July 28, 2005 (hereinafter, "Office Action"), the drawings were objected to under 37 C.F.R. 1.83(a), in which "every feature of the invention specified in the claims" is shown in the drawings. Specifically, the Examiner objected to "the ray-forming device further comprising transparent surfaces and reflective surfaces, in which the transparent surfaces are alternately disposed adjacent to the reflective surfaces in a checkerboard-like arrangement" (claim 8).

Please note that Figure 3 depicts a ray-forming device 150, including alternately disposed opaque or reflective surfaces 60 and transparent surfaces 70, in which the opaque and transparent surfaces are disposed in a checkerboard-like arrangement. In the specification, the ray-forming device 150 in such a configuration is referred to as a "patterned beam splitter" (page 9, lines 14 – 21). The specification also specifically describes dimensions of the ray-forming device 150 when the patterned beam splitter 150 is disposed at a 45-degree angle relative to the incoming light as having rectangular components of dimension  $N \times N\sqrt{2}$  (page 10, lines 11 – 17).

The Examiner further objected to the phrase "third micromirror array and a fourth micromirror array" (claim 13) because such an arrangement is not featured in the drawings. Although the specification does disclose the possibility of having a four-micromirror array arrangement (page 11, line 28 – page 12, line 2), an additional drawing depicting this embodiment is not included. Please note that claim 13 has been cancelled, which resolves the drawing objection.

The drawings are further objected to as failing to comply with 37 C.F.R. 1.84(p)(5), as the Examiner asserts that the reference element 140 is not present in the drawings. Please note that element 140, a birefringent crystal 140, is depicted in Figure 5, between the ray-forming device 150 and the

micromirror arrays 110C and 110D. Please note that the block diagrams are merely representative of the structural and functional components of the disclosed invention, and may not necessarily be a physical representation. In Figure 5, the birefringent crystal 140 is a rectangular block. In the specification, the birefringent crystal 140 is described as "a refractive optic capable of separating light into two polarized image components" (page 13, lines 1 – 2). The two image components separated by the birefringent crystal 140 (image components 56B and 56C) are further described as being "oriented at ninety degrees relative to" one another (page 13, lines 6 – 11). Thus, the element 140 is represented in Figure 5 and described both functionally and structurally (in terms of the effect on the incoming and outgoing light). The description in the drawings and in the specification should be sufficient to allow one of ordinary skill in the art the ability to make the disclosed invention.

Because the drawings meet the requirements of 37 C.F.R. 1.83(a) and 1.84(p)(5), as regards the amended claims, no changes to the drawings have been made.

#### **Specification**

The Examiner objected to the title of the invention, asserting that the title is not descriptive. Please note that the title has been amended in the "Specification Amendments" section at the end of this document. The title has been changed from "MICROMIRROR DEVICE" to "MICROMIRROR DEVICE WITH ADJACENTLY DISPOSED SUPPORT REGION".

#### **Rejection under 35 U.S.C. § 103(a)**

##### **Claims 1 – 3, 6, 8 – 10, 12 – 13, and 18 – 20**

The Office Action states that claims 1 – 3, 6, 8 – 10, 12 – 13, and 18 – 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lin (6,089,719) in view of Marshall (6,406,148). In view of the amendments to the claims, Applicant respectfully disagrees.

Please note that claim 1 has been amended to include the limitations of claims 3 and 4, while claims 3 and 4 have been cancelled. In amended claim 1, the amendments further specify the nature of the first and second micromirror arrays, that is, that the first micromirror array includes alternately disposed micromirror and non-micromirror regions arranged in a checkerboard-like arrangement; likewise, the second micromirror array includes alternately disposed micromirror and non-micromirror regions arranged in a checkerboard-like arrangement. Further, the second micromirror array and the first micromirror array are recited as being complementary.

In the specification, the meaning of the term "complementary" is explained (page 5, lines 17 – 25) and care is taken in the figures to show how the micromirror and non-micromirror arrangement between the two micromirror arrays is deliberately complementary, ensuring that the final composite image (130 in Figure 1, 160 in Figure 5, 180 in Figure 6) includes a full representation of the original image.

Similar to claim 1, claim 18 has been amended to include limitations that further specify the first and second micromirror arrays, as well as their complementary relationship.

Both claims 1 and 18 include language referring to the "perfect or nearly perfect fill factor" of the composite image. As described in the background section, the ability to generate an optical system that produces an image with a 100% fill factor has confounded prior art optical designers. By splitting the micromirror array into two arrays with half the number of micromirrors (arranged in a checkerboard pattern), it is possible to generate a composite image with 100% fill factor. Neither Lin nor Marshall teach or disclose such an optical system.

For at least these reasons, Applicant's amended claims are non-obvious over the cited art.

**Claims 21 – 22**

The Office Action further states that claims 21 – 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gibbon (6,582,080) in view of Marshall (6,406,148). In view of the amendments to the claims, Applicant respectfully disagrees.

Please note that claim 21 has been amended to include limitations clarifying recitations regarding the location of the control and support mechanism associated with each micromirror. Amended claim 21 recites that the micromirror has an associated non-mirrored region. The amendment further recites that, while "the micromirror support post is disposed beneath the micromirror" (which allows the micromirror to be actuated), the support circuitry and pads are not disposed beneath the micromirror surface, but are instead "disposed beneath the associated non-micromirror surface".

The support circuitry and pads are used to control each micromirror. Since each micromirror operates as a single pixel, it most often is controlled independent of all other pixels. Therefore, each micromirror includes its own control and support circuitry. This circuitry must be located somewhere. Typically, the control and support circuitry is located directly beneath the micromirror, allowing short connections to be made.

Since the micromirror arrays of the claimed invention are arranged with non-micromirrors and micromirrors, this provides an opportunity for the some of the control and support circuitry to be disposed on an adjacent non-micromirror region, rather than directly beneath the micromirror. Since the micromirror array has an equal number of non-micromirror and micromirrors, a non-micromirror can readily be associated with each micromirror. While the support portion (see mirror support post 122 in Figure 4A) of the control and support region 128 would still be disposed beneath the micromirror, the support circuitry 124 and pads 126 (Figure 4A) may be located adjacent to and not beneath the micromirror (see Figure 4B).

The language of amended claim 21 is a recitation of this change over the prior art. Neither Lin, Marshall, or Gibbon teach or suggest such a disposition of the support circuitry and pads. For at least these reasons, Applicants amended claims 21 and 22 are non-obvious over the cited art.

#### **Claim 5**

The Office Action further states that claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lin in view of Marshall and further in view of Gibbon. Applicant respectfully disagrees.

As with claim 22, claim 5 was amended to clarify that the "support circuitry and pads" are not disposed beneath the micromirrors, but beneath the associated adjacent non-micromirror portion of the micromirror array. Further, amended claim 5 depends from amended claim 1, which is non-obvious over the cited art. For at least these reasons, Applicant's amended claim 5 is non-obvious over the cited art.

#### **Claim 7**

The Office Action further states that claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lin in view of Marshall and further in view of Robinson (6,031,657). Applicant respectfully disagrees.

Claim 7 depends from amended claim 1, which is non-obvious over the cited art. In addition to the arguments made regarding Lin and Marshall, Robinson neither teaches nor suggests an arrangement of complementary micromirror arrays, as recited in claim 1, nor do any of the cited art teach or suggest a composite image which has a perfect or nearly perfect fill factor. For at least these reasons, Applicant's claim 7 is non-obvious over the cited art.

#### **Claim 11**

The Office Action further states that claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lin in view of Marshall and further in view of Daniele (4,733,252). Applicant respectfully disagrees.

Claim 7 depends from amended claim 1, which is non-obvious over the cited art. In addition to the arguments made regarding Lin and Marshall, Daniele neither teaches nor suggests an arrangement of complementary micromirror arrays, as recited in claim 1, nor do any of the cited art teach or suggest a composite image which has a perfect or nearly perfect fill factor. For at least these reasons, Applicant's claim 7 is non-obvious over the cited art.

### **Claim 23**

The Office Action further states that claim 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gibbon in view of Marshall and further in view of Robinson. Applicant respectfully disagrees.

Claim 23 depends from amended claim 21, which is non-obvious over the cited art. Neither Gibbon, Marshall, nor Robinson teach or suggest the disposition of support circuitry and pads adjacent to rather than beneath the micromirrors, as disclosed in Applicant's specification and recited in claim 21. For at least this reason, claim 23 is non-obvious over the cited art.


### **Conclusion**

For at least the reasons given above, Applicant's amended claims are non-obvious over the cited art. Applicant respectfully requests allowance of all claims.

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Respectfully Submitted,

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Date

  
Carrie A. Boone  
Reg. No. 48,282  
**CARRIE A. BOONE, P.C.**  
2450 Louisiana, # 400-310  
Houston, Texas 77006  
713-521-2176 Main  
713-521-2177 Fax